

Claims

We claim:

1. A method for producing a speed ratio change from an off-going speed ratio to an oncoming speed ratio
5 in a transmission having an input, clutch, primary and secondary layshafts, first and second couplers, and output, the method comprising the steps of:

providing between the input and primary layshaft a primary power path having a first speed ratio;

10 providing between the input and secondary layshaft a one-way drive secondary power path having a second speed ratio that is equal to or less than the first speed ratio;

changing the state of a first coupler to connect
15 driveably the secondary layshaft and output;

25 disengaging the clutch;

changing the state of a second coupler to connect driveably the primary layshaft and output at the oncoming speed ratio; and

20 re-engaging the clutch.

2. The method of claim 1 further comprising the step of changing the state of the first coupler to disconnect driveably the secondary layshaft and output.

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3. The method of claim 1 wherein the transmission includes a first pinion and first gear associated with the off-going speed ratio, and wherein the step of changing the state of a first coupler further comprises:

30 connecting the secondary layshaft and output through the first coupler, first pinion and first gear.

4. The method of claim 1 wherein the transmission includes a first pinion and first gear associated with

the off-going speed ratio, and wherein the step of disengaging the friction clutch further comprises the step of:

connecting the input and output through the
5 secondary power path, first pinion and first gear.

5. The method of claim 1 wherein the transmission includes a second pinion and second gear associated with the oncoming speed ratio, and wherein the step of
10 changing the state of a second coupler further comprises the step of:

connecting driveably the primary layshaft and output through the second coupler, second pinion and second gear.

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6. The method of claim 1 wherein the transmission includes a second pinion and second gear associated with the oncoming speed ratio, and the step of re-engaging the friction clutch further comprises the step of:

20 connecting the input and output through the primary power path, primary layshaft, second coupler, second pinion and second gear.

7. The method of claim 1 wherein the oncoming
25 speed ratio is greater than the off-going speed ratio.

8. The method of claim 1 wherein the oncoming speed ratio is less than the off-going speed ratio.

30 9. A method for producing a speed ratio change from an off-going speed ratio to an oncoming speed ratio in a transmission having an input, clutch, primary and secondary layshafts, first and second couplers, first pinion, first gear associated with the off-going speed

ratio, second pinion, second gear associated with the oncoming speed ratio, and output, the method comprising the steps of:

- providing between the input and primary layshaft a
5 primary power path having a first speed ratio;
- providing between the input and secondary layshaft a one-way drive secondary power path having a second speed ratio that is equal to or less than the first speed ratio;
- 10 changing the state of a first coupler to connect driveably the secondary layshaft and output through the first coupler, first pinion and first gear;
- disengaging the clutch to connect the input and output through the secondary power path, first pinion and
15 first gear;
- changing the state of a second coupler to connect driveably the primary layshaft and output through the second coupler, second pinion and second gear; and
- re-engaging the clutch to connect the input and
20 output through the primary power path, primary layshaft, second coupler, second pinion and second gear.

10. The method of claim 9 further comprising the step of changing the state of the first coupler to
25 disconnect driveably the secondary layshaft and output.

11. In a power transmission having an input, a friction clutch, primary and secondary power paths, and output, a method for producing a speed ratio change from
30 an off-going speed ratio to an on-coming speed ratio, comprising the steps of:

- establishing a potential drive connection between the input and output through the secondary power path;
- disengaging the clutch;

driveably connecting the input and output through the secondary power path at a speed ratio that is equal to or less than the speed ratio produced by the off-going speed ratio through the primary power path;

- 5 establishing a potential drive connection between the input and output through the primary power path in the oncoming speed ratio; and
re-engaging the clutch.

- 10 12. The method of claim 11, further comprising disestablishing the potential drive connection between the input and output through the secondary power path.

- 15 13. The method of claim 11 wherein the oncoming speed ratio is greater than the off-going speed ratio.

14. The method of claim 11 wherein the oncoming speed ratio is less than the off-going speed ratio.

- 20 15. A method for producing a speed ratio change from an off-going speed ratio to an oncoming speed ratio in a transmission having an input, clutch, primary and secondary layshafts, first and second couplers, and output, the method comprising the steps of:

- 25 providing between the input and primary layshaft a primary power path having a first speed ratio;
providing between the input and secondary layshaft a one-way drive secondary power path having a second speed ratio that is equal to or less than the first speed
30 ratio;

changing the state of a first coupler to connect driveably the secondary layshaft and output ;
disengaging the clutch;

changing the state of a second coupler to disconnect the primary layshaft and output;

changing the state of a third coupler to connect driveably the primary layshaft and output at the oncoming
5 speed ratio; and
re-engaging the clutch.

16. The method of claim 15 further comprising the step of changing the state of the first coupler to
10 disconnect driveably the secondary layshaft and output.

17. The method of claim 15 wherein the transmission includes a first pinion and first gear associated with the off-going speed ratio, and wherein the step of
15 changing the state of a first coupler further comprises:
connecting the secondary layshaft and output through the first coupler, first pinion and first gear.

18. The method of claim 15 wherein the transmission
20 includes a first pinion and first gear associated with the off-going speed ratio, and wherein the step of disengaging the friction clutch further comprises the step of:

connecting the input and output through the
25 secondary power path, first pinion and first gear.

19. The method of claim 15 wherein the transmission includes a second pinion associated with the off-going speed ratio, and wherein the step of changing the state
30 of a second coupler further comprises the step of:

connecting driveably the primary layshaft and output through the second coupler, second pinion and first gear.

20. The method of claim 15 wherein the transmission includes a third pinion and second gear associated with the oncoming speed ratio, and wherein the step of changing the state of a third coupler further comprises
5 the step of:

connecting driveably the primary layshaft and output through the third coupler, third pinion and second gear.

21. The method of claim 15 wherein the transmission
10 includes third pinion and second gear associated with the oncoming speed ratio, and the step of re-engaging the friction clutch further comprises the step of:

connecting the input and output through the primary power path, primary layshaft, third coupler, third pinion
15 and second gear.

22. The method of claim 15 wherein the oncoming speed ratio is greater than the off-going speed ratio.

20 23. The method of claim 15 wherein the oncoming speed ratio is less than the off-going speed ratio.

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